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ON

SUFFICIENT AND INSUFFICIENT
DIETARIES,

WITH SPECIAL REFERENCE TO

THE DIETARIES OF PRISONERS.

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PRESENTED
by the
AUTHOR.

This paper will be found to contain most of the facts and statements comprised in the evidence submitted by the author to the Commissioners on Penal Servitude and Prison Discipline, of which the reports have been recently published. But there is also in these pages much that does not appear in the evidence referred to, and the subject is treated in more connected manner. The tables, too, are arranged upon a uniform plan, so as to admit of comparison one with another; and though it would have been possible to give to the paper a more scientific and exact character by reducing all the articles of food to the dry form, or to their chemical elements, it is believed that the tabular statements are sufficiently precise for all practical purposes, seeing that the several dietaries consist of nearly the same solid elements, bread, meat, and potatoes, and the same liquid elements, gruel, and broth or soup, with or without cocoa.

ON SUFFICIENT AND INSUFFICIENT DIETARIES, WITH ESPECIAL
REFERENCE TO THE DIETARIES OF PRISONERS.

IF the most distinguished of our chemists, physiologists, and physicians were asked, each for himself, to prescribe a fitting diet for an individual of a given sex and age, the task would not be found an easy one. The results would perhaps display a general agreement in principle, but they would certainly exhibit a wide divergence in detail; for the elementary constituents of a wholesome diet, and the proportions in which they ought to be blended, are much better understood than the quantities necessary to the support of life and health.

But the difficulties which attach to the selection of a suitable diet in the case of individuals, are increased tenfold when we come to arrange the dietaries for men, women, or children, in the mass; especially when the element of economy has to be added to the considerations of fitness by which our choice must be mainly determined. Even in the comparatively simple case of a boys' school, the diet which would be sufficient for the eldest boy could scarcely fail to be in excess for the youngest, and *vice versâ*; and in the army and navy, which consist of men selected from the population on account of their freedom from deformity and disease, there is a similar disparity of age, as well as great diversity of constitution. But in such institutions as workhouses, prisons, and hospitals, the task of constructing suitable dietaries is beset with unusual difficulties. If we take the case of prisoners, to which I wish especially to direct the attention of the Society this evening, we shall find the task of prescribing proper dietaries by no means easy. For in the first place, though the majority of prisoners are between the ages of

20 and 35, a considerable minority, even in convict prisons, are under 20, or above 35.* There are lads and aged men to be provided for in the same prison; and a single dietary, though recommended by convenience, if sufficient for the majority, must needs be excessive for some, and defective for others, among the minority. In the second place, the prisoners, instead of being picked men, as in the army and navy, or selected boys, as in some of our large schools, constitute a mixed class of whom about 60 per cent. are found to be free from mental infirmities or bodily defects, while nearly 25 per cent. suffer from bodily deformities or defects, congenital or acquired, more than 11 per cent. from scrofula and chronic diseases of the lungs or heart, and 4 per cent. from weak mind, insanity, and epilepsy.† In the third place, the prisoners at Millbank or Pentonville, with the exception of the few who are under treatment, are variously occupied; some at the light labour of picking coir; others as tailors, or shoemakers, or weavers, or matmakers, or basket-makers; others again in jobbing work, as bricklayers, carpenters, or smiths, or as gardeners; and a few as cooks or bakers, or as nurses in the infirmary. So that we have at least three well defined causes of difference between prisoner and prisoner—age, constitution, and occupation—which may fairly claim to be taken into account in the arrangement of our dietaries; and yet, as any minute classification of prisoners based upon these considerations is impracticable, for obvious reasons of convenience and economy, there seems to be no alternative, but to adopt, for all male prisoners not under medical treatment, one uniform diet, which must prove in excess for some and in defect for others, if it is to maintain the mass in a state of health, and with a capacity for labour.

The work of devising suitable dietaries for prisoners is also rendered difficult by the necessity of giving practical effect to certain considerations, affecting in a special manner this class of persons. Inasmuch as they are under punishment, their diet should minister to their correction by being unattractive and monotonous; and inasmuch as they are maintained at the cost of the community which they have injured and impoverished, it ought to be as economical as possible. But these very natural conditions are met on the opposite side, by a theory of which I shall have more to say presently, that

* The ages of convicts, which will be found in detail in a paper by the author, read at the London Meeting of the Social Science Congress, "On some Results of a Recent Census of the Population of the Convict Prisons in England; and especially on the Rate of Mortality at present prevailing among Convicts," may be very roughly stated as follows:—

Under 20, less than 10 per cent.

From 20 to 35, more than 60 per cent.

Above 35, less than 30 per cent.

† For particulars, see the paper cited above.

men in prison require a better and more nutritious diet than the rest of the community; and that the necessity for such a diet increases with the length of their sentences. Hence the anomaly, that the worst offenders come to have the best diet; hence, also, the further anomaly that the able-bodied pauper in the workhouse, and the honest working man, unless very favourably circumstanced, have less food to eat than the worst criminals, and that even soldiers and sailors have little, if any, advantage over them in this respect.

Such being the inherent difficulties of the subject which I have undertaken to examine, I shall begin by seeking to throw some light upon it from the researches of science; then proceed to place myself under the direct teaching of experience; and conclude by giving some account of our existing prison dietaries.

I.—Scientific Considerations.

For one or two years, and in some cases longer, nature nourishes and builds up the frame of the infant, by the milk of the mother, which may be described as an emulsion consisting of a certain quantity of solid elements, intimately mixed up with about eight times their weight of water. The researches of the chemist have shown that this solid portion consists of less than half its bulk of saccharine matter, more than a third of its bulk of the matter of cheese, somewhat more than a quarter of its bulk of oil or butter, with about one hundredth part of mineral substances, of which by far the larger proportion consists of phosphate of lime. The cheese, the mineral matters, and part of the butter supply the solid structures, while the sugar and the rest of the butter keep the body warm by their combustion. It is worthy of a passing remark that the milk of herbivorous animals is sometimes found to contain a free acid, while that of carnivorous animals constantly shows an acid reaction, and that the saccharine matter, in either case, readily takes on the acid fermentation.

If we adopt the usual calculation, and assume $2\frac{1}{2}$ parts of sugar to be equivalent as fuel, to 1 part of oil, we have in human milk an emulsion which contains plastic or nitrogenous material in the proportion of about 1 part to 3 of respiratory material. This proportion is sometimes stated as 10 of plastic material to 40 of respiratory matter calculated as starch,* a proportion which I shall assume as correct in what I have further to say on the scientific aspect of my subject.

By chemical research, then, we learn that the body of the infant is nourished and gradually built up by a fluid which contains one part of the constructive element to three or four parts of the non-constructive or respiratory elements; to which we may perhaps add

* For exact figures, see "Day's Physiological Chemistry," pp. 280 and 491.

that the occasional existence in milk of a free acid, and the great ease with which it turns sour, point to the possible necessity of a free acid as a constituent of a good diet. But this teaching of nature, and of science as her faithful interpreter, fails us in an important point. We do not know the quantity of this typical emulsion which the infant requires and consumes for the support of its life, and the progressive growth of its frame; and if we did, the knowledge would not admit of application to the human being at his full growth.

From milk, which nourishes and builds up the frame of the young of men and animals, it is natural to turn to the egg which performs the same function for the bird in the earliest stage of its existence. Here we find resemblances and differences well worthy of observation. The water which, in milk, was eight times as abundant as the solid matters it held dissolved or suspended, is found in the egg to be only three times as abundant; and the solid matters themselves are found to consist wholly of albumen (the equivalent of casein as constructive material), of oil (the equivalent of butter), and of saline matters, to the exclusion of sugar.* The albumen holds to the oil the proportion of 14 to $10\frac{1}{2}$, or about 7 to 5. By this analysis then we learn that, as with animals so with birds, a material fitted to build up the body must be combined with a material which also enters into the composition of its textures, but which at the same time is a supporter of respiration and a producer of heat. Perhaps, too, we are intended to learn this lesson, that the sugar which exists in the milk of the breathing creature, and not in the egg of the bird which has not yet respired, and holds communication with the air only through its porous shell,—that the sugar is in some peculiar manner the food of respiration.

Of the milk of animals it may suffice to observe that, while it is made up of the same constituent parts as human milk, those parts are blended in different animals in different proportions. Of this difference no feasible explanation can be given. The most obvious difference between the human infant and the young of animals, namely that the former does not derive its clothing from the milk of the mother, while the latter does, only partially explains the discrepancy in question. But the difference between human milk and that of animals is not such as to prevent the latter from being very freely used as an article of diet in every part of the world, and for persons of all ages. Cow's milk, especially, is everywhere in large demand, and enters into many of our prison dietaries. Eggs, though much used by the community at large, do not figure in the ordinary dietaries of our gaols.

What milk is to the support of infant life, that (as the chief,

* See "*Johnston's Chemistry of Common Life*," by Lewes, pp. 131 and 138.

though not the exclusive, nutriment of the adult) is wheaten flour, and the flour of the cereals, oats, barley, rye, and maize. The analyses and calculations of the chemist have shown that all these substances consist of the plastic, or constructive material, gluten (the equivalent of casein in milk and of albumen in the egg), mixed with from five to six times its weight of the respiratory elements, sugar, starch, and oil. For 10 parts of casein in human milk, there are 40 parts of respiratory or heat-producing elements calculated as starch, while in wheaten flour 10 parts of gluten are mixed with 46 parts of respiratory elements, also calculated as starch. How near the flours or meals of the other cereals approximate to this standard of human milk, the following table will show :*

	Plastic.	Non-nitrogenous (calculated as Starch).
MILK (HUMAN)	10	40
Wheatflour	10	46
Oatmeal	10	50
Ryemeal	10	57
Barleymeal	10	57
MILK OF COW	10	30

But though the cereals which are most largely employed as staple articles of food, resemble thus closely the food of the infant, and the proportion of the two leading elements in wheat approximate to the proportions in milk more nearly than in the other grains, it must not be supposed that the chemical composition of milk and of wheat presents more than this general resemblance. This is so far from being the case that, while in human milk the saccharine element constitutes little more than one-third of the dry solid matter, the sugar and starch of wheat taken together constitute more than four-fifths; while the casein in milk forms little less than a third, in wheat it is little more than a tenth; and while the butter or oil counts also for less than a third in milk, it scarcely constitutes a fiftieth part in wheaten flour. Wheaten flour, then, as compared with milk, is defective in plastic or constructive material, and still more in oily matters; and it is worthy of remark that the poorer classes in towns very generally supply this defect of oil by butter or dripping, and in the country by the fat of pork or bacon. The deficiency of gluten and albumen, as compared with the casein of milk, is supplied by milk itself, by eggs, by meat, fresh or salt, and by the seeds that abound in casein—the pea, the bean, and the lentil.

Of wheaten flour I have only further to remark, that it stands at

* The figures are taken from "Day's Physiological Chemistry," p. 491.

the head of the cereals, if measured by its yield of sugar; that in the abundance of its starch it yields the palm only to rice (differing in this respect little from Indian meal); that in gluten and albumen (its plastic materials) it follows next in order to lentils, beans, peas, and oats; that in fat it occupies an intermediate position; and that in gum, and in mineral matters, only, does it occupy a place somewhat below the average.

From chemical analysis, then, as well as from large experience, we learn that wheaten flour is admirably adapted to the support of human life. We also know that, when converted into bread, it enters more or less largely into all our dietaries. For this reason, and especially because bread and water, for three days or more in succession, form the staple food of prisoners under punishment, I shall offer a few remarks on this article.

A sack, or 280 pounds, of wheaten flour, mixed into a dough with salt and water, whether fermented or unfermented, issues from the oven as about 360 pounds of bread. The yield varies according to the quality of the flour and the skill of the baker, and also with the two different processes of fermentation and aëration. But, for my present purpose, it will suffice to state that the raw wheaten flour, in being converted into cooked or baked bread, absorbs 2 parts of water for every 7 parts of flour.* Of other changes it is not necessary to speak; but it should be understood that, though part of the starch may be converted into sugar and gum, neither the gluten and albumen, nor the oil in which wheaten flour is acknowledgedly deficient, admit of any increase in the process of bread making. And yet, in cases where bread is the only article of food, as in prisoners under punishment, or almost the only one, as in the very poorest classes both in town and country, it may be desirable to augment the glutinous element, to introduce the oil usually supplemented by butter or dripping, fat pork or bacon, and even to add something to the saccharine element. Now there are two ways of effecting this. We can make a considerable addition to the gluten and the oil by adding the bran to the flour,† or making the bread of

* 100 parts of wheaten flour already contain about 16 parts of water, so that an addition of two-sevenths, or nearly 29 parts of water, will raise the whole quantity of water contained in bread to 45 per cent., at which it is usually stated.

† The superiority of brown bread, or of whole-meal bread, to white bread as commonly made, may be inferred from a comparative statement of the constituents of fine wheaten flour and bran respectively.

	Fine Flour.	Bran.
Water	16	13
Gluten	10	18
Fat	2	6
Starch, &c.	72	63
	100	100

whole-meal obtained from the grain either before or after the modern process of decortication. By adding to bread so made a certain quantity of treacle, the element of sugar may be economically augmented, while the oil may be considerably increased by substituting for part of the wheaten flour a portion of Indian meal, which is remarkable for the quantity of oil it contains.* In this way, by substituting the whole-meal for the fine flour, adding a certain quantity of treacle and a certain proportion of Indian meal, a bread might be produced which would prove at once nutritious and economical, and form the nearest convenient approach to the composition of human milk, which is generally, and, I believe justly, assumed as the standard of a perfect food. On bread of this mixed composition, prisoners under punishment might, I think, be confined for a longer period than at present; and if the element of a free acid, of the necessity of which I shall have more to say shortly, were added in the form of the potato, this period might be still further extended.

If such a mixed bread as is here spoken of should be objected to as requiring the use of too many materials, or for any other reason, no difficulty ought to be raised in substituting brown, or whole-meal, bread for the white bread, now so generally in use, both within and without the walls of our prisons. I have no doubt whatever, that it would prove more wholesome as well as less expensive.†

* The statement in the text respecting Indian meal is justified by the following figures:—

	Fine Wheaten Flour.	Indian Corn Meal.
Water	16	14
Gluten	10	12
Fat	2	8
Starch, &c.	72	65
	100	100

See "Johnston's Chemistry of Common Life," vol. i, p. 100.

† In support of the opinion expressed in the text, the following passages may be adduced:—1. Pereira, in his treatise on food and diet, quotes with approval the following passage from Dr. Prout's well-known work on the "Nature and Treatment of Stomach and Urinary Diseases," p. 300, "Bread, therefore, made with undressed flour, or even with an extra quantity of bran, is the best form in which farinaceous and excremental matters can be usually taken; not only in diabetes, but in most of the other varieties of dyspepsia, accompanied by obstinate constipation. This is a remedy, the efficacy of which has been long known and admitted; yet strange to say, the generality of mankind choose to consult their taste rather than their reason, and by officiously separating what nature has beneficently combined entail upon themselves much discomfort and misery."

2. "Bread made from the whole-meal is therefore more nutritious; and as

I have hitherto spoken only of wheaten bread, to the exclusion of rye, barley, and Indian corn, which equally admit of being wrought and baked into bread; of oatmeal, which can be used for a similar purpose; of the potato which is advantageously used as an ingredient of the best bread; and of rice which, on account of its power of absorbing water, is conveniently introduced into the cheaper kinds of bread. Of peas, beans, and lentils I have already spoken incidentally. The exact composition of these substances is given in a table at p. 127 of Dr. Lankester's work on food, to which I refer, and of which I now avail myself to the extent of placing them in the order in which they stand in relation to their most important elements, beginning always with that substance which contains the element under notice in the largest quantity.

STARCH.—Rice; wheat and maize; rye and buckwheat; barley; oats; peas; beans; lentils; potatoes.

SUGAR.—Wheat; oats; barley and rye; potatoes; beans, peas, lentils, and buckwheat; rice; maize.

FAT.—Maize; oats; beans, peas, and lentils; wheat; buckwheat; rye; rice; barley; potatoes.

GLUTEN, CASEIN, AND ALBUMEN.—Lentils; peas and beans; oats; rye; wheat; barley; maize; buckwheat; rice; potatoes.

ASHES.—Barley; beans; oats; peas; buckwheat; rye; wheat; lentils; maize; potatoes; rice.

It is obviously on the flour or meal of one or other of these cereals that we must depend for supplying the staple of our dietaries. We must supply our paupers and prisoners with bread made from wheat, barley, rye, or Indian meal, or with bread skilfully constructed

"many persons find it also a more salutary food than white bread, it ought to be more generally preferred and used. 'The bran of wheat possesses also the property of dissolving the flour or bread with which it is mixed, and of rendering it more easily digestible in the stomach.' To this property of bran, as well as to the nourishment it yields, is to be ascribed a portion of those wholesome qualities which many persons have recognised in whole-meal bread."—"Johnston's Chemistry of Common Life," vol. i, p. 97.

3. "The husk of the grain is ground along with the grain to make this,"—namely, *brown bread*. "This husk contains more gluten, more nutritive matter than the whole interior, the proportion being, in the husk, about 17, in the seed about 12, in 100 parts. White flour is not only more expensive, but it is far less nutritious than flour in which the bran is ground. Yet the poor as well as the rich prefer white bread. The former even consider the recommendation to eat brown bread as a sort of insult. This is one of the matters in which the world has gone grievously wrong. Brown bread is not only more nutritive, but it is more digestible than white, and if it were not from long habit, would probably be considered more palatable."—"Dr. F. W. Headland's Medical Handbook," p. 94.

with the best elements of several of these; or we must make use of oatmeal with water, as gruel, or of oatmeal or Indian meal with milk, as porridge or pudding. Assuming these productions of the cereals as the basis of our dietaries, we must (especially where milk is not admitted as an element) be careful to provide the potato, or some equivalent vegetable or potherb, or some soup containing or not containing meat, but rich in vegetables or potherbs, as guarantees against the scurvy. With bread and potato as a groundwork, it would not be difficult to construct a great variety of diet tables to which no serious objection could be taken on scientific grounds, and which would be sure to maintain a fair state of health in those who are placed upon them.

Thus far I have allowed myself to be guided by the light of science—of science herself largely indebted to nature and experience—and have been led to the discovery of certain suitable forms of food which may be conveniently taken as the staple of our dietaries. But I have not exhausted the teachings of science, for she professes to guide us, not merely to the discovery of suitable articles of food, but also to prescribe the quantities and proportions in which they should be administered. Vierordt, an eminent German physiologist, weighing carefully the results of numerous and precise experiments on that which enters the body as food, and that which leaves it through its several channels of purification and discharge, tells us that an adult male, to keep in good condition, should take about 4 ounces of albuminous matters, nearly 3 ounces of fat, and about $10\frac{1}{2}$ ounces of amylaceous food daily. About 84 ounces of water would be taken as drink, and about an ounce would have to be allowed for the saline matters contained in, or added to, the three leading articles of food.*

If we take this scientific estimate of Vierordt as our standard for an adult male, assume a free access to water, and that the saline matters which the body requires are partly contained in any food which we may select, and partly added, as common salt, in the preparation of it, it will not be difficult to frame a dietary which shall fitly carry this scientific theory into practice.

The dietary of Vierordt, expressed in grains, consists of—

Albuminous Matters.
1,920 grains.

Fat.
1,440 grains.

Amylaceous Matters.
5,040 grains.

Now if we assume a pound of bread per diem and a pound of potatoes to be a good basis on which to build up a sufficient dietary, it will be seen how moderate an addition is required to bring the several quantities up to this standard. The three elements, albu-

* See "Day's Physiological Chemistry," p. 496.

minous, oily, and amylaceous, exist in the pound of bread and pound of potatoes in the following quantities:—

	Albuminous Matters (Gluten and Albumen).	Fat,	Amylaceous Matters (Starch, Sugar, and Gum).
	Grains.	Grains.	Grains.
Wheaten bread 1 lb.	861	65	3,847
Potatoes 1 ,,	100	14	1,402
Total	961	79	5,249
Vierordt's dietary as above	1,920	1,440	5,040
Deficiency	959	1,361	209
Requiring about {	2 ozs. lean meat or its equivalent	3 ozs. fat or its equivalent	excess

The amylaceous matter is more than sufficiently supplied by the pound of bread and pound of potatoes, while the remaining elements might be readily supplied by 4 ounces of lean meat three times a-week, 6 ounces of fat pork three times a-week, and a pint of nutritious pea-soup once a-week.

This dietary then would consist of the following elements in the quantities annexed:—

	Per Diem.	Per Week.	
	ozs.	ozs.	
Bread	16	112	
Potatoes	16	112	
Lean meat	—	12	
Fat pork	—	18	
Meat, peas, pot-herbs, &c., } &c., in soup	—	8	
Weekly total	—	262	

If a dietary based on Vierordt's data were required from which the meat element should be wholly excluded, it might be obtained by the following ingredients:—

	Albuminous Matters (Gluten and Albumen).	Fat.	Amylaceous Matters (Starch, Sugar, and Gum).
	Grains.	Grains.	Grains.
Bread 1 lb.	861	65	3,847
Potatoes $\frac{1}{2}$,,	50	7	701
Oatmeal $\frac{1}{2}$,,	638	198	1,810
Milk 1 pint	350	245	315
Vierordt's dietary as {	1,899	515	6,673
above	1,920	1,440	5,040
	In defect 21 grains	In defect 925 grains add 653	In excess 1,633 = 653 grains of fat
		In defect 272	

By the figures of this table it is shown that the dietary indicated by Vierordt, but containing plastic material slightly deficient, with little more than half an ounce in defect of fatty matters (the excess of amylaceous matters being converted into its equivalent in fat), may be obtained by combining—

Bread	1 lb. =	112 ozs. per week
Potatoes	$\frac{1}{2}$ „ =	56 „
Oatmeal	$\frac{1}{2}$ „ =	56 „
		<hr/>
		224 ozs. per week, with 7 pints of milk

These dietaries, thus roughly based on the scientific formula of Vierordt, I shall distinguish by the epithet “Scientific;” and shall so designate them throughout what remains of this communication. I shall now examine the dietary question (still in relation to prisoners chiefly) by the light of experience, but also by an occasional appeal to authority. Indeed, I shall commence this second division of my paper by referring to the views of John Howard.

II.—*Teachings of Experience.*

Howard, in his work on prisons,* says that “those who drink only water, and have no nutritious liquor, ought to have at least a pound and a half of bread every day,” and he further recommends half-a-pound of meat on the Sunday with a quart of the broth in which it had been boiled, and a penny a-day in money for cheese, butter, potatoes, pease, or turnips. If we suppose the penny a-day to be expended in the purchase of potatoes, it would procure a pound, and leave some surplus for other purchases, so that the dietary thus recommended by Howard might consist at least of—

Bread, 24 ozs. per day, or	168 ozs. per week
Potatoes, 16 „	112 „
Meat	8 „
	<hr/>
Total	288

a quantity of solid food greatly in excess of that comprised in the dietaries based on the scientific calculations of Vierordt.

In another place† Howard, referring to a previous statement of his, that he was not an advocate for “extravagant and profuse allowance to prisoners,” and that he pleaded “only for necessaries in

* “The State of the Prisons in England and Wales,” &c., 2nd edition (1780), section 3, p. 40.

† The section headed “Bridewell’s,” p. 47.

“such a moderate quantity as may support health and strength for labour,” declares himself to be “no advocate for luxury in prisons,” and says that “he would have no meat diet for criminals in houses of correction, or at most only on Sundays.” Yet he “would plead that they should have, at least, a pound and a half of good household bread a-day, and a quart of good beer; besides twice a-day a quart of warm soup made from peas, rice, milk, or barley. For a change they might sometimes have turnips, carrots, or potatoes.” For this very liberal dietary, consisting of 168 ounces of bread per week, with 14 quarts of nutritious soup, and 7 quarts of good beer, Howard deems it necessary to offer an apology. “It may be said, this diet will starve those who work in houses of correction; but I am persuaded of the contrary, by what I have seen abroad, in the galleys, in the houses of correction, and among the most robust labourers. *Though I am sensible that persons confined, whose minds are depressed, need more nourishment than such as are at liberty.*”

I ask the attention of the Society to the very liberal notions respecting diet of this great prison reformer, and especially to the concluding words of this passage, which I have distinguished by italics. It is the earliest expression that I have met with of an opinion to which I have already once adverted, and which I shall have occasion again to notice.

The views of John Howard, which I have just cited, were expressed by him about the year 1780, and may be taken to be the opinions of a man in habits of intimacy with the most accomplished physicians of his day, and of a large experience, formed after visiting the prisons of England and the Continent; but at a period when all our prisons abounded with every conceivable moral abuse and sanitary defect, when it was easy to ascribe to one cause evils really due to another, and when mental depression to a degree unknown at present was likely to prevail.

An interval of upwards of forty years must be understood to elapse between the date of Howard's experiences and the important event in the history of prison dietaries to which I am now to refer.

The Penitentiary at Millbank was opened for the reception of prisoners in the year 1816, and in the year 1822 became the scene of the events I am about to relate. The building was erected on a piece of made ground bordering on the Thames, saturated with water and surrounded by a stagnant ditch. Drinking water was supplied from the river, and there is reason to believe that the arrangements for warming and ventilating the building were defective. That these unwholesome influences made themselves felt, there is ample evidence in the fact that in a period of two years and eight months preceding

the events to which I am about to refer eleven cases of diarrhœa and dysentery, severe enough to be entered in the monthly reports of the then medical superintendent, occurred, of which six proved fatal; and in the further significant fact that after the diet of the prisoners had been reformed, and the scurvy with its associated diarrhœa and dysentery cured, these last-named diseases reappeared with great severity in the summer and autumn of 1823, so that the prison was obliged to be closed for several months, and the prisoners to be removed.

I may add that my predecessor in office, Dr. Baly, basing his opinion on facts which came under his notice, and especially on the frequent re-appearance of the fever, dysentery, and nervous affections, which formed part of the epidemic of 1823, but without the scurvy, always considered the site of the prison unhealthy, and constantly acted on that belief; until at length the old dietary of 1822, condemned as excessive, was virtually restored, being replaced by a dietary nearly equal in quantity, and even more nutritious.

My own experience of four years leads me to think that, thanks to the progressive sanitary improvements of the last quarter of a century and upwards, Millbank Prison is now in a very healthy condition.

The tenants of a prison in the unhealthy state just described became in the years 1822-23 the involuntary subjects of the following disastrous experiment.

On the 22nd March, 1822, Dr. A. Copland Hutchison, the then Medical Superintendent, in obedience to the instructions of the Committee, addressed to them a letter in which he stated that from the high state of health the prisoners had hitherto enjoyed, and the absolute state of plethora which a great majority of them had shown after a certain residence within the walls of the Penitentiary, as well as the frequent recurrence of disease arising from that cause, he had no hesitation in stating that the quantity of food consumed by them was greater than sufficient to maintain them in robust health, with all due consideration to the labour they might, by any possibility, be subjected to.

After adverting to the long terms of imprisonment to which the convicts in Millbank were at that time subjected, Dr. Hutchison proceeded to recommend a reduced scale of diet. The Committee, however, preferred a dietary of their own, which came into play on the 5th of July of this same year, 1822.

The elements of the original dietary which Dr. Hutchison deemed excessive, of the reduced dietary which he suggested in its place, and of the reduced dietary of the Committee, are shown in the subjoined table, together with the present ordinary diet for male prisoners at Millbank:

	Original Dietary.	Dr. Hutchison's Suggestion.	Dietary of the Committee.	Present Ordinary Diet.
	OZS.	OZS.	OZS.	OZS.
Bread	168	168	168	154
Meat (boiled beef)	24	8	Nil	35
Potatoes.....	112	16	Nil	112
Total solid food....	304	192	168	301
	Pints.	Pints.	Pints.	Pints.
Broth or soup	8	12	14	3½*
Gruel or porridge	14	14	7	7
Cocoa.....	—	—	—	5½
Total liquid food....	22	26	21	19½

* This is little more than the liquor in which the meat is boiled. But the broth or soup in the dietary of the Committee was probably scarcely more nutritious; for it contained less than one ox-head in 100 pints.

This reduced diet which consisted of 1½ lbs. of bread per diem or 168 ounces per week, with 7 pints of gruel and 14 pints of broth or soup, containing about 10 ounces of meat per week, to the total exclusion of solid meat and potatoes, severely affected the health of the prisoners. In the autumn following, they became feeble and languid, and a few slight cases of scurvy showed themselves; and in the early spring (in the months of February and March), the scurvy, with diarrhœa and dysentery as its associates, became very prevalent; so much so, that more than half the prisoners were attacked. The deaths from dysentery up to the 5th April, 1823, were six in number.

That this reduced dietary was the most efficient and direct of the causes which combined to produce this outbreak of scurvy and dysentery there can be no doubt. An unusually cold winter and the low temperature of the prisoners' cells at night were favourable to the disease, and the unhealthy character of the site probably tended to the development of diarrhœa and dysentery; but there is no room for doubt, that the reduced and altered dietary was the cause of the scurvy and afforded the only adequate explanation of the extent and severity of the outbreak.*

Here then we have two examples of sufficient if not of redundant dietaries, consisting of solid food to the amount of about 300 ounces, and liquid food to the extent of 22 pints in the one and 19 pints in

* Consult the Report of the Select Committee on the State of the Penitentiary at Millbank, ordered by the House of Commons to be printed, 8th July, 1823; also Dr. Latham's "Account of the Disease lately prevalent at the General Penitentiary," and Dr. Baly's papers "On the Prevention of Scurvy in Prisons," "Pauper Lunatic Asylums," &c., published in the "London Medical Gazette," 10th February, 1843; and "On the Mortality of Prisons," read before the Royal Medical and Chirurgical Society, in February, 1845.

the other. Of the sufficiency of the one, Dr. Hutchison's statements may be taken to be satisfactory evidence; of the sufficiency of the other, my own experience of nearly four years may be allowed to stand as voucher. We have also in the dietary of the Committee an example of an insufficient dietary,—proved to be insufficient by the event; but whether that insufficiency consists in mere reduction of quantity, or in the omission of some element essential to a wholesome dietary, is a question that must be reserved for discussion till I have given the results of later experience.

I now turn for information to two important documents, published in the year 1836. They are contained in the "Second Annual Report of the Poor Law Commissioners for England and Wales." The first is the circular letter relative to workhouse dietaries, addressed to the Clerks of the Boards of Guardians by Mr. Edwin Chadwick; and the second the "Report on Middlesex and Surrey," by Mr. C. Mott, Assistant Poor Law Commissioner. Mr. Chadwick's letter offers to the Board of Guardians six several dietaries for able-bodied paupers, all of which it is alleged had been used in different parts of England, and proved to be sufficient in quantity, and perfectly unexceptionable as to the nature of the provisions specified in each. These six dietaries for able-bodied male paupers consisted of the following elements in the quantities stated.* The constituents are so arranged as to admit of comparison with the other dietaries quoted in this paper.

English Pauper Dietaries, 1836.

	Ounces per Week.					
	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.
Bread.....	84	112	132	116	98	102
Meat (pickled pork or bacon*).....	15	—	13	6*	10	8
Potatoes (or other vegetables*)	24	—	24*	—	48	24
Total of the above....	123	112	169	122	156	134
Meat pudding	—	16	—	12	—	—
Suet or rice pudding....	14	32	—	24	14	16
Yeast dumpling.....	—	—	—	—	—	22
Cheese	8	18	18½	14	8½	8
Total of solid food....	145	178	187½	172	178½	180
Soup or broth { <i>pints,</i> <i>pr. wk.</i>	7	—	1½	6	3	2
Gruel or porridge „	10½	—	10½	10½	10½	—
Total liquid food	17½	—	12	16½	13½	2
Vegetables (quantity not specified*)	—	*	—	*	24	—

* The corresponding dietaries for women are not given in this paper, which must be understood throughout to deal only with adult males.

Of these six dietaries, the most liberal (No. 5) allows to the adult male able-bodied pauper $202\frac{1}{2}$ ounces of solid food, including vegetables, and $13\frac{1}{2}$ pints of liquid food, against the 301 ounces of solid food and $19\frac{1}{4}$ ounces of liquid food of the present ordinary dietary at Millbank for the male convicts, being an excess of food in favour of the convict of nearly 100 ounces. Mr. C. Mott, referring to these six dietaries, says of them, that he is prepared to show that this allowance is not only sufficient, but that it exceeds the quantity consumed by agricultural labourers and mechanics, who support themselves by their own exertions; and he alleges that agricultural labourers are unable to procure for themselves and families more than an average allowance per head of 122 ounces of food (principally bread) per week, of which he supposes that the man consumes 140 ounces, namely, 134 ounces of bread and 6 ounces of meat. These statements were based on returns from labourers in the southern agricultural counties, whose income did not average for the family more than 2s. per head per week. From similar returns obtained from *manufacturers* or *mechanics* living in towns, with average incomes of 3s. 9d. per head per week, Mr. Mott inferred that these persons did not consume so large a quantity of nutritive matter, though they ate more meat; and this was found to hold good also in reference to workmen able to earn on an average 6s. 9d. a-week. On extending his inquiries to classes of men using extreme bodily exertion, as mowers, or sawyers, and prize-fighters when training, he found their consumption to extend to from 27 to 30 ounces per day, being 189 or 210 ounces per week; and he quotes the experience of Sir Edward Parry, to the effect that 10 ounces of biscuit, 9 ounces of pemmican, and 1 ounce of cocoa daily (being 20 ounces of solid food per diem, or 140 ounces per week) were found amply sufficient to support his sailors under the ordinary exertions of performing the regular ship duties, while it was agreed on all hands that 27 or 28 ounces per diem (being 189 or 196 ounces per week) would have been amply sufficient for their support under all the hardships of that climate. After noticing the strange discrepancies then existing in the workhouse dietaries, and especially the extreme instances of the Farnham Workhouse, where he caused the day's food to be placed in the scales, and found it to weigh 66 ounces,—a quantity at which the paupers grumbled as insufficient. and the case of the pauper washerwomen of Bnlcamp Workhouse, Suffolk, who were formerly allowed 8 pints of beer per day each. Mr. Mott alludes to similar discrepancies in the dietaries of prisons, and instances the allowance to transported felons as amounting to 49 ounces per diem (being 343 ounces per week). Though some of these statements of Mr. Mott are wanting in precision, they go far to justify the allowance of food to the able-bodied pauper, as con-

tained in the six dietaries given in the table, and to raise a doubt of the necessity of the more liberal scale of diet awarded to the criminal.

The statements made by Mr. Mott in this Report of 1836, were partly anticipated by Mr. Chadwick, in his "Extracts from the Information received by His Majesty's Commissioners as to the Administration and Operation of the Poor Laws," published in 1833. From this interesting and instructive document, I extract (in a condensed form) the dietary table given at p. 261.

	Ounces of Solid Food.
1. The independent agricultural labourer	122
2. „ soldier	168
3. „ able-bodied pauper, with the addition, in most work- houses, of vegetables 48 ozs., soup 3 quarts, milk porridge 3 quarts, table beer 7 quarts, and many other comforts	151
4. „ suspected thief	181-203
5. „ convicted „	239
6. „ transported „	330

Mr. Chadwick also quotes an important statement made by Mr. Hewitt, to the effect that a reduction from a diet consisting of 169 ounces of solids weekly to one of 134 ounces, was productive of no bad effects; the paupers maintained on the low diet were as well, if not better, after, than before the change; and few of them, comparatively to those who had been accustomed to live on a more full diet, suffered by the cholera. It is worthy of remark that the first quantity stated (169 ounces), is one ounce in excess of the reduced diet at Millbank, which preceeded the outbreak of scurvy and dysentery, and that this 169 ounces was further reduced without injury to health.

But I ought not to rest satisfied with the ingenious comparison made by Mr. Chadwick, in 1833, seeing that the materials exist for a more exact comparison between the dietaries of paupers and criminals at the present time, and that the present opportunity is a favourable one for either invalidating or confirming the popular impression that the prisoner is better fed than the pauper. Now it would be an act of injustice to those gentlemen on whom the supervision and management of our gaols and convict establishments devolve, if we were to compare the able-bodied inmates of our workhouses whose average term of residence does not perhaps exceed two months, with prisoners whose sentences are of much longer duration, or with convicts who are incarcerated for periods of three years and upwards.

The only satisfactory course to adopt is to compare the dietary of some class of prisoners whose period of detention does not greatly exceed the sojourn of the able-bodied pauper in the workhouse with the dietary of such able-bodied pauper.

Such a dietary is to be found in class 3 of the "Dietaries recommended for the use of County Gaols and Prisons," by the Home "Office."* It is the dietary for "convicted prisoners employed at hard labour for terms exceeding twenty-one days, but not more than six weeks; and convicted prisoners not employed at hard labour for terms exceeding twenty-one days, but not more than four months." Though the several county gaols and prisons do not always exactly conform themselves to this description, class 3 may in all cases be taken to represent a class of prisoners resembling more closely than any other the condition of the able bodied pauper. In order to render this comparison as fair as possible, I have arranged in one table twelve dietaries of county prisons, as given in the Return for 1857, and the same number of dietaries of union workhouses, the unions being situate in the same cities or county towns as the prisons, or at least in the same counties. The union dietaries, for copies of which I am indebted to the kindness of my colleague, Mr. Purdy, are those which have received the formal sanction of the Poor Law Board at various dates from 1845 to 1859. I give the broad results of an analysis of these two classes of dietaries in the annexed table. The circumstance most worthy of notice in relation to the two dietaries, is that while the prison dietaries rarely comprise more than three solid and two liquid elements (bread, meat, and potatoes; and meat-soup and gruel), the pauper dietaries exhibit a much greater variety both of solid and liquid elements.

Prisoners (Class III) and Paupers Compared.

PRISONS.	Solids.		Liquids.		UNIONS.
	ozs.	pts.	ozs.	pts.	
1. Gaol of Newgate	212	17	190½	20½	1. City of London
2. Horsemonger Lane Gaol	160	18	177½	13	2. St. Mary, Newington
3. Bedford Prison	210	16	237	13½	3. Bedford
4. Stafford County Gaol ..	210	16	220	22½	4. Burton-upon-Trent
5. St. Augustine's Prison, Canterbury....	210	16	210	—	5. Canterbury City
6. Chester County Gaol....	210	16	224	36	6. Chester City and County
7. Durham „	232	17	170	11	7. Durham
8. Sussex Gaol, &c., Lewes	168	21	196½	15½	8. Lewes
9. Nottingham County Gaol	238	16	175	36	9. Nottingham
10. Southampton County Prison	199	17	186	15	10. Southampton Town and County
11. Salford New Bailey Prison	210	—	162	43	11. Salford
12. York House of Correction, Wakefield }	167	18	200	22½	12. Wakefield

* See Parliamentary Return, No. 154, printed 21st March, 1857. The dietaries were first recommended in 1843.

If we carefully examine this table, we shall find that the prisoner in our county and borough gaols has little, if any, advantage over the pauper. In six prisons, the diet is somewhat better than in the six unions compared with them, while in the six others it is somewhat worse. Taken one with another, the prisoners have a slight advantage in the more solid elements of their diet, and the paupers in the liquid elements. The prison diet may be fairly represented by an average of 202 ozs. of solid food and 16 pints of liquid food, the pauper diet by 196 ozs. of solid food and 20 pints of liquid food per week.

A very interesting document, bearing on the question of dietaries, is to be found in the Second Annual Report of the Board of Supervision for the Relief of the Poor in Scotland. It is in the shape of a report by two accomplished Scotch physicians, Drs. Alison and Christison, and bears date 16th January, 1847. After examining the dietaries of the charity workhouses in Scotland, and the documents relating to the diet of the poorhouses in England and Ireland, these gentlemen recommend three dietaries—for the healthy adult male inmates of workhouses who do little or no work, and who have no great appetite; for those who also do little or no work, but have a vigorous appetite; and for those who do work. These three dietaries consist of the following elements:—

Scotch Pauper Dietaries (Drs. Alison and Christison), 1847.

	Per Week.		
	No. 1.	No. 2.	No. 3.
	ozs.	ozs.	ozs.
Bread	42	56	56
Meat	—	—	28
Oatmeal	42	56	56
Total solid food	84	112	140
	Pints.	Pints.	Pints.
Butter-milk or skimmed milk	7	10½	10½
Broth (containing 2 ozs. of meat, and } vegetables	10½	10½	10½
Total liquid food	17½	21	21

These dietaries do not admit of exact comparison with those comprised in the table at p. 253; but it is obvious that they are on a much less liberal scale. The third dietary of the series, or that devised for able-bodied paupers who do work, contains five ounces less of solid food than No. 1 (the least liberal of the six English dietaries), while the liquid elements (milk and broth) are only in excess by 3½ pints. It ought, however, to be understood that the oatmeal of the Scotch dietary is reckoned as solid aliment, and that there

is an excess of milk in the Scotch dietaries; but even when these differences are taken into account, the best of the three Scotch dietaries will be found to be less liberal than five out of six of the standard English dietaries.

And here it will be interesting to observe how much more liberally the worst class, of the worst section, of our criminals has been dealt with than the English or Scotch pauper. The convicts in Millbank, who are under punishment for serious breaches of prison discipline, are placed upon a diet which is known as the "*Penal Class Diet*." It was so framed as to exclude meat, but it offers ample compensation in the abundance of the milk element, and of the highly nutritious meal of the oat and maize. I will compare this penal diet of the convict with the diet of the able-bodied English pauper which is the most liberal in its allowance of bread and meat, and with the dietary of the Scotch pauper with a good appetite but doing little or no work, premising that the convicts of the penal class also do little or no work.

	Penal Class, Millbank.	English Pauper.	Scotch Pauper.
	ozs.	ozs.	ozs.
Bread	84	132	56
Oatmeal	70	—	—
Indian meal.....	70	—	—
Potatoes	56	24	56
Meat	—	13	—
Cheese	—	18½	—
Total solid food	280	187½	112
	Pints.	Pints.	Pints.
Milk.....	10½	—	10½
Soup or broth	—	1½	10½
Gruel or porridge	—	10½	—
Total liquid food.....	10½	12	21

The indication afforded by these tables of a disposition to treat the criminal with more liberality than the pauper, is very strikingly confirmed by the proceedings of the prison authorities in the experiments which they caused to be made at Pentonville during the years 1842 and 1843. The object which they had in view was to discover a suitable diet for prisoners under solitary confinement in a building planned with the utmost attention to every sanitary requirement, and erected on a site selected for its salubrity. It could not be alleged that a liberal diet was necessary to counteract the depressing effects of a low and unhealthy site such as that occupied by the prison at Millbank, though it might be required to support the prisoner under the depressing influence of the separate system of

confinement. But whatever the motive, certain it is that the dietary adopted at the very opening of the prison, was such a diet as would scarcely have been employed in a workhouse. It consisted of the following elements :—

	Per Week.		Per Week.
Bread <i>ozs.</i>	120	Soup <i>pints</i>	2½
Meat „	20	Gruel „	7
Potatoes „	40	Cocoa „	5¼
Cheese „	4	Milk <i>ozs.</i>	14
		Molasses „	1½
Total solid food.... „	184	Total liquid food.. „	15½

This dietary, it will be observed, is in excess of the most liberal of the six selected for the guidance of our English workhouses, and still more in excess of the best of the three Scottish dietaries. But it was only the first of a series of five experimental dietaries; and it fell short of the one ultimately adopted, and now in use, by no less than 96 ounces of solid food, and 1 pint of liquid food, per week.

I will present these five dietaries in the most intelligible form I can devise, and then offer some observations upon them. The gruel, cocoa, milk, and molasses, it should be observed, are common to all the dietaries.

Experimental Dietaries, Pentonville Prison, 1842-43.

	Per Week.				
	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.
Gruel <i>pints</i>			7		
Cocoa „			5¼		
Milk <i>ozs.</i>			14		
Molasses „			1½		
Bread <i>ozs.</i>	120	140	112	112	140
Meat „	20	20	28	28	28
Potatoes „	40	40	56	112	112
Cheese „	4	4	—	—	—
Soup <i>pints</i>	2½	2½	3½	3½	3½
Percentage of prisoners—					
Losing weight	62	43	70	22	16
Gaining „	26	46	14	45	59
Stationery	12	11	16	33	25
Average loss (in pounds)	5	1·68	1·75	1·50	1·58
„ gain „	2·25	2·16	1·21	1·55	1·84
Total loss	310	73	122	33	25
„ gain	58	98	17	70	108
Balance of loss	252	—	105	—	—
„ gain	—	25	—	37	83

The first of these experimental diets was in use nearly $3\frac{1}{2}$ months (from December 21st, 1842); the second, less than 2 months (from May 4th, 1843); the third, about $5\frac{1}{2}$ months (from May 24th, 1843); the fourth, nearly 2 months (from November 14th, 1843); and the fifth from January 10th, 1844, onwards.

Before I proceed to examine these important experiments, I must observe that they are wanting in some elements of scientific exactness. The periods for which the prisoners were placed on the respective diets are unequal; the experiments were not made at the same season of the year, and the groups submitted to the several experiments did not consist of the same prisoners. Still the results of the experiments are instructive, and deserving of careful attention. I will state them in as few words as possible, distinguishing, for the sake of clearness, additions from substitutions.

Experiments 1 and 2.—An addition of 20 ounces of bread in the week leads to a decrease in the number of prisoners losing weight from 62 to 43 per cent., and an increase of prisoners gaining weight from 26 to 46 per cent., a balance of loss of 252 lbs. being exchanged for a balance of gain of 25 lbs. This increase of 277 lbs. is altogether out of proportion to the extent of the change in the diet, and to the results of any other comparison for which the experiments afford the materials.

Experiments 3 and 4.—On making a simple addition of 56 ounces of potatoes to the diet of experiment 3, the number of prisoners losing weight falls from 70 to 22, while the number gaining weight rises from 14 to 45, the balance of loss of 105 lbs. being changed to a balance of gain to the amount of 37 lbs. The increase of weight is therefore equivalent to 142 lbs.

Experiments 3 and 5.—An addition of 28 ounces of bread and 56 ounces of potatoes causes the prisoners losing weight to fall from 70 to 16, and those gaining weight to rise from 14 to 59, and substitutes a balance of gain of 83 lbs. for a balance of loss of 105 lbs., which is equivalent to a gain of 188 lbs.

Experiments 4 and 5.—On adding 28 ounces of bread, the prisoners losing weight fall from 22 to 16, and those gaining weight rise from 45 to 59, and the balance of gain of weight rises from 37 lbs. to 83 lbs., equivalent to a gain of 46 lbs.

Experiments 1 and 3.—On substituting 8 ounces of meat for 8 ounces of bread, and 16 ounces of potatoes, with 1 pint of soup for 4 ounces of cheese, the number of prisoners losing weight is increased from 62 to 70, while those gaining weight fall from 26 to 14; but in consequence of the extraordinary average loss of 5 lbs. per man under experiment 1, the balance of loss is reduced from 252 lbs. to 105 lbs., which is equivalent to a gain of 147 lbs. In this case the improvement is altogether disproportionate to the change of diet.

Experiments 1 and 4.—By substituting 8 ounces of meat for 8 ounces of bread, and 72 ounces of potatoes with a pint of soup for 4 ounces of cheese, the number of prisoners losing weight falls from 62 to 22, while the number gaining weight rises from 26 to 45, a balance of loss of 252 lbs. being changed to a balance of gain of 37 lbs. This is equivalent to a gain of 289 lbs. So that an addition of 56 ounces of potatoes in the week raises the gain under experiments of 1 and 3 from 147 lbs. to 289 lbs.

Experiments 1 and 5.—The substitution of 20 ounces of bread, 8 ounces of meat, 72 ounces of potatoes, and 1 pint of gruel for 4 ounces of cheese, causes the number of prisoners losing weight to fall from 62 to 16, and the number gaining weight to rise from 26 to 59; while it substitutes a balance of gain of 83 lbs. for a balance of loss of 252 lbs. This is equivalent to a gain of 335 lbs.

Experiments 2 and 3.—A substitution of 8 ounces of meat, 16 ounces of potatoes, and 1 pint of soup for 28 ounces of bread and 4 ounces of cheese, causes the number of prisoners losing weight to rise from 43 to 70, and the number gaining weight to fall from 46 to 14, while it substitutes for a balance of gain of 25 lbs. a balance of loss of 105 lbs. This is equivalent to a loss of 130 lbs. As the dietary in experiment 3 is at least as nutritious as that in experiment 2, this very considerable loss of weight is in striking opposition to the theory on which the experiments are based.

Experiments 2 and 4.—A substitution of 8 ounces of meat, 72 ounces of potatoes, and 1 pint of soup for 28 ounces of bread and 4 ounces of cheese causes the number of prisoners losing weight to fall from 43 to 22, and the number gaining weight to fall from 46 to 45, and raises the balance of gain of 25 lbs. to 37 lbs. This is equivalent to a gain of 12 lbs.

Experiments 2 and 5.—A substitution of 8 ounces of meat, 72 ounces of potatoes, and 1 pint of soup for 4 ounces of cheese, causes the number of prisoners losing weight to fall from 43 to 16, and the number gaining weight to rise from 46 to 59, and substitutes a balance of gain of 83 lbs. for a balance of gain of 25 lbs., being an increase of 58 lbs.

Taken one with another, these experiments are not satisfactory or convincing. They are, as I have already stated, wanting in scientific exactness; they deal in substitutions where simple additions of food would have been preferable; and though the general tendency of the experiments is to connect increase of weight with increase of food, the one increase is not in proportion to the other, and the exception to the rule, in experiments 2 and 3, is striking and suggestive of doubt. But of this, I think, there can be no doubt whatever, that the small increase which, in the fifth experiment, followed an addition of 28 ounces of bread, did not justify the

experimenters in bringing their series of trials to a conclusion, and in fixing on 140 ounces of bread as the proper allowance to the prisoner, rather than the 112 ounces of the fourth experiment, or some quantity intermediate between 112 ounces and 140 ounces.

Now the value of these experiments rests upon the assumption that there is a very intimate relation existing between increase of food and increase of weight, and that this relation is not apt to be seriously disturbed by other causes patent or obscure, known or unknown. But if it can be shown that the weight of prisoners rises and falls in a marked degree from obscure causes, which cannot be controlled or set aside by the experimenter, then it must follow that the experiments under consideration are not to be trusted as guides to a sufficient dietary. That such obscure causes are in operation, a reference to some experiments made in the Glasgow Bridewell in 1840 will show.†

A series of eight experiments were made, consisting of six (the first three and the last three) on groups of 10 prisoners variously constituted of men and women at different ages, and of boys and girls about 13 or 14 years of age; and of two larger groups of 21 and 20 respectively, of which the greater number were adult males. The particulars of the eight dietaries, with the average weights of the prisoners at the end of the month (each dietary being continued for that period), are given in the table annexed.

Experiments at Glasgow Bridewell, 1840.

	Per Week.			
	No. 1.	No. 2.	No. 3.	No. 4.
	ozs.	ozs.	ozs.	ozs.
Oatmeal	91	91	91	91
Potatoes, boiled } (baked*)	336	336	336*	224
Meat	—	—	—	28
Total solid food ...	427	427	427	343
	Pints.	Pints.	Pints.	Pints.
Butter-milk (skim- } med milk *)	10½	2½*	10½	10½
Total liquid food...	10½	2½	10½	10½
Average weight gained	4 lbs.	4 lbs.	—	—
„ lost	—	—	1½ lbs.	1¼ lbs.
Prisoners submitted { to experiment {	5 men 5 boys	5 men 5 girls	{ 3 young men 5 „ women 2 boys	{ 16 males 5 females

† See “Fifth Report of the Inspectors of Prisons (Scotland),” p. 9.

Experiments at Glasgow Bridewell, 1840—Contd.

	Per Week.			
	No. 5.	No. 6.	No. 7.	No. 8.
	OZS.	OZS.	OZS.	OZS.
Oatmeal	91	56	91	—
Potatoes, boiled	112	112	—	672
Bread	—	112	56	—
Meat	56	—	—	—
Total solid food	259	280	147	672
	Pints.	Pints.	Pints.	Pints.
Butter-milk	10½	7	10½	—
Broth*	—	—	14	—
Total liquid food	10½	7	24½	—
Average weight gained	—	2¾ lbs.	—	3½ lbs.
„ lost	very slight loss	—	less than ½ lb.	—
Prisoners submitted { to experiment {	15 males 5 females	5 youths 5 young women	5 young men 5 „ women	10 young men and boys

* Containing to the quart 4 ozs. of barley and 1 oz. of bone, with vegetables.

Now, though the groups of prisoners are small and variously constituted, and the experiments consequently wanting in scientific exactness, some of the results are worth noting as throwing light upon the value of these weighings, when used as tests of a sufficient dietary. Between the first and third experiments, for instance, there is this difference only, that the potatoes are boiled in the one and baked in the other; but while the ten prisoners in the one experiment gain on an average 4 lbs., the same number, in the other experiment, lose, on an average, 1½ lbs. Again, though the substitution in the second experiment of 1½ pints of skimmed milk for 10½ pints of butter-milk in the first, leaves the average gain of 4 lbs., unaltered, the restoration of the 10½ pints of butter-milk in the third experiment is followed by an average loss of 1½ lbs., in lieu of an average gain of 4 lbs. It is also worthy of remark that, while the four dietaries which are followed by a considerable average gain are all vegetable diets, and one of them consists solely of 6 lbs. of potatoes daily, two out of four dietaries which show a loss of weight contain a liberal element of meat. Lastly, it may be observed that, while the eighth dietary, consisting wholly of potatoes, shows an average gain of 3½ lbs., the seventh dietary, the only one from which the potato is wholly omitted, shows an average loss of less than half-a-pound.

The inference to be drawn from these experiments, that gain or loss of weight is a deceptive test of a sufficient diet, is strengthened by more exact experiments now to be described.

On the 29th of last January, I caused 25 healthy prisoners continuously employed as mat-makers, and the like number of prisoners continuously employed as tailors, the whole 50 prisoners being fed during the whole duration of the experiments on the ordinary diet of Millbank prison, to be carefully weighed for six weeks in succession. By comparing the weights of the first and fifth weighings, and those of the second and sixth weighings, in the case of the matmakers and in that of the tailors, I obtained four results fairly comparable with those of the Pentonville experiments, but without any alteration of diet.

After the first complete interval of one month, the experiments on the 25 mat-makers yielded the following results:—

68 per cent.	had <i>gained</i> , on an average.....	1'09 lbs.
20	„ <i>lost</i> , „	1'15 „ and
12	„ <i>neither gained nor lost</i> : while the } ultimate result was an average nett gain of }	0'51 „

After the second complete interval of one month, this experiment being supposed to begin one week later than the first,—

16 per cent.	had <i>gained</i> , on an average.....	2'12 lbs.
80	„ <i>lost</i> , „	2'10 „ and
4	„ <i>neither lost nor gained</i> : while the } ultimate result was an average nett loss of..... }	1'46 „

The corresponding experiments on the 25 tailors gave the following results:—

First Experiment.

68 per cent.	had <i>gained</i> , on an average.....	1'98 lbs.
28	„ <i>lost</i> , „	1'14 „
4	„ <i>neither gained nor lost</i> : while the } ultimate result was an average nett gain of }	1'02 „

Second Experiment.

32 per cent.	had <i>gained</i> , on an average.....	2 lbs.
56	„ <i>lost</i> , „	1'59 „
12	„ <i>neither gained nor lost</i> : while the } ultimate result was an average nett loss of.... }	0'11 „

Here, then, under as complete an equality of circumstances as it was possible to command, with the same men, the same occupations, and the same food, the two experiments in each case being separated by the short interval of one week, the mat-makers lose in the second experiment nearly a pound more than they gain in the first; while the tailors, who gain more than a pound in the first experiment, lose a small fraction of a pound in the second.

Now, as the prisoners submitted to experiment at Pentonville were placed on each of the five dietaries for periods exceeding one month, we have only to suppose the weighings to have commenced a week earlier or a week later to have obtained widely different results.

One fact established by these experiments at Millbank is well worthy of remark. In the first experiment, the 25 mat-makers gained, one with another, about half-a-pound, while the tailors, in the corresponding experiment, gained more than one pound; the mat-makers, in the second experiment, lost nearly a pound and a half, while the tailors only lost a small fraction of a pound. But it is not to be doubted that the mat-makers, who gained least and lost most, were in quite as good a state of health as the tailors, who gained more and lost less.

In these experiments one result well worth noting is the different order of weekly increase and decrease of weight in the two classes of prisoners—the mat-makers and the tailors.

In the first week the mat-makers, who weighed collectively 243 stone, *gained* 56 lbs., and the tailors, who weighed collectively nearly 250 stone, *gained* only 38 lbs. In the second week, the mat-makers *lost* 24 lbs., while the tailors *gained* 12 lbs. In the third week, the mat-makers *gained* 3 lbs., while the tailors *lost* 4 lbs. In the fourth week, the mat-makers *lost* 22 lbs., and the tailors 19 lbs. In the fifth week, the mat-makers and tailors *both gained*, the one 7 lbs., the other 11 lbs.

One other result worthy of attention is obtained by throwing the two classes of prisoners into one mixed group, and noting the fluctuations of weight from week to week. A group of 25, consisting of 12 mat-makers and 13 tailors, yielded the following weekly fluctuations:—

In the first week there was a gross *gain* of 56 lbs.; in the second week a *loss* of 14 lbs.; in the third week a *gain* of 2 lbs.; in the fourth week a *loss* of 14 lbs.; in the fifth a *gain* of 10 lbs.; in the sixth a *gain* of 18 lbs.; in the seventh a *loss* of 5 lbs.; in the *eighth* a *gain* of 11 lbs.; in the ninth a *gain* of 12 lbs.; and in the tenth and last a *loss* of 5 lbs. These weighings were continued from January 19th to March 30th.

If we suppose a series of weighings to be made at intervals of one month from each successive week of this series, so as to resemble the experimental weighings at Pentonville, we should have had, as the result of the first weighing, a gain of 29 lbs; as the result of the second, a loss of 17 lbs.; and, as the results of the five remaining weighings, a gain of 16 lbs., 9 lbs., 36 lbs., 37 lbs., and 13 lbs., respectively.

The facts which I have now brought forward, proving, as they do,

that there are great and constant fluctuations in short intervals of time, in the weights of men whose diet, occupation, and mode of life remain unchanged; and also that men who are differently occupied, though fed on the same food, and in other respects similarly treated, differ from each other in the order as well as the degree of fluctuation in weight; these facts cannot but impair the value hitherto attached to weight as a test of sufficiency or insufficiency of diet. And I must repeat my conviction, that the experiments conducted at Pentonville Prison in 1842-43 have not sufficed to determine, with any approach to exactness, the quantities of the several articles of food comprised in the dietary of that prison which are necessary to the maintenance of the health and efficiency of the prisoner.

Hitherto I have been dealing with mixed dietaries, several of which contain meat in some form or other; and the experiments at Pentonville were with dietaries of which meat formed a part; but I must now ask the attention of the Society to dietaries from which meat has been wholly excluded, and to three dietaries especially which contain no animal food whatever. The first of these exclusively vegetable dietaries is very interesting, inasmuch as it is a prison diet on which prisoners were fed for long periods, and weighed at the beginning and end of their sentences. The history of this dietary, and of its effects on the health of the prisoners, and on their weight, will be found in the Report of 1823, on the epidemic at Millbank. The facts are given on the authority of the Governor of the Devizes House of Correction. The dietary consisted of—

	Ounces per Week.
Bread	196
Potatoes	112
	—
Total solid food	308, and gruel 7 pints.
	—

On two days in the week a vegetable soup was substituted for the potatoes; but there was no meat whatever in this dietary, and no milk, or other animal matter. Nevertheless, the Governor was able to report that this dietary agreed well with the prisoners, that no loss of strength was noticed, and that no prison could be more healthy. And he added "There is not now, nor has there been, any "case of scurvy." It should also be observed that this exclusively vegetable diet, having been adopted in an English prison, must have been strange to most of the inmates who, before they became prisoners, had doubtless been able to procure more or less of animal food and of meat. The prisoners had been kept on this diet for various periods up to eighteen months—many of them for six months and more; 292 prisoners, in various groups, were weighed on entering and on leaving the prison. Of 38 prisoners thus weighed after

periods varying from two weeks to six months, 27 were found to have gained, 2 to have lost, and 9 to have neither gained nor lost. The average gain in weight was 3 pounds. Two other prisoners, after eighteen months, had gained, on an average, 6 lbs., and 20 prisoners, confined for twelve months, had gained at the end of that period 5 lbs. on the average. Four other groups of prisoners, confined during six months, three months, two months, and one month, respectively, gained, on an average, 3 lbs., 3 lbs., 2 lbs., and 2 lbs.

Here then we have in favour of a bread—potato—and—gruel diet the most conclusive evidence. There was no loss of strength, an excellent state of health, no scurvy, and a most satisfactory addition to the weight of the prisoners. It should also be observed that there were among the prisoners several whose terms of imprisonment were sufficiently long to severely test any dietary.

Dr. Baly, in his paper in the "London Medical Gazette," to which I have already had occasion to refer, gives an example of the same kind. It is that of the Stafford County Gaol, in which the weekly allowance of food consisted of—

Bread	196 ozs.
Potatoes	112 „
Total.....	308 „

with 21 pints of gruel, but no meat and no soup, and yet scurvy did not occur, its absence being verified by his own inspection of 70 prisoners confined in that gaol for periods of from three to six months.

In this case, also, a diet consisting wholly of vegetable food must have been new to the prisoners.

The third example of an exclusive vegetable diet is afforded by the eighth of the series of Glasgow experiments. The ten prisoners were fed for one month on 6 pounds of potatoes per diem; and at the end of that period had increased in weight, one with another, no less than $3\frac{1}{2}$ lbs., or only half-a-pound less than the average gain in the first and second experiments of that series.

These are the only examples that I have happened to come across of a purely vegetable diet—a diet from which not merely meat, but every animal product, even milk, was excluded. But I have already, in this paper, given several examples of dietaries from which meat was wholly excluded, the only animal element being milk made into porridge with oatmeal, and into pudding with Indian meal. I ask your attention again to these exceptional dietaries, of which I am able to give you two notable examples. In the Report on military prisons (1861), the diet for military prisoners in solitary confinement for periods less than fifty-six days is shown to consist of—

	Ounces per Week.
Bread	56
Oatmeal ..	56
Indian meal	42
<hr/>	
Total solid food	154, with 10½ pints of milk.

and the penal class diet of Millbank Prison comprises---

	Ounces per Week.
Bread	84
Oatmeal	70
Indian meal	70
Potatoes	56
<hr/>	
Total solid food	280, with 10½ pints of milk.

The diet of military prisoners given above does not encounter objection on the part of the Governors or Medical Officers whose views are stated in the Report, and it may, therefore, be assumed to be sufficient for the support of robust men in confinement for periods less than fifty-six days; and this view receives strong confirmation from a passage in Dr. Tufnell's Report from Dublin; he says, "To the increase in the dietary, and especially its alteration, I have ever been, upon principle, opposed, because I found that I could, upon the old scale of dietary, maintain the men in the most perfect condition."

Of the sufficiency of the more liberal penal class diet of Millbank, not merely for prisoners undergoing short terms of imprisonment, but for those who are in close confinement, and under punishment, for many months together, I am able to furnish the most convincing proofs. This dietary was favourably reported upon by my predecessor, Dr. Baly, in 1858, and in my own report for 1859. It has stood the test both of experimental weighings and, of more general observation of the state of health of the prisoners; and I have recently had occasion to report cases of men whose health has been maintained on this diet for seven, nine, eleven, fourteen, fifteen, seventeen, and eighteen months; and cases of women similarly kept in good health on a similar diet for nine, ten, eleven, fourteen, and eighteen months. The women who are on this diet are weighed every month, and the results are quite satisfactory.

I have no hesitation, then, in expressing an opinion in favour of the sufficiency of a dietary from which the meat element is wholly excluded. I have no doubt that health may be preserved, and with it the capacity for labour, on a diet consisting of milk and vegetable food; and I should have no hesitation in prescribing for all criminals under short terms of imprisonment a diet consisting wholly of bread

and potatoes. I think that the experience acquired at the Devises House of Correction, at Stafford, and at Glasgow would be a complete justification for such a dietary.

I must now revert to the outbreak of scurvy and dysentery which occurred at Millbank in 1823, and endeavour to answer the important question whether that fatal epidemic ought to be attributed to the reduction which took place in the quantity of the food, or to the omission from that dietary of some important element. Now, the reduction effected in the original dietary of the prison went to the extent not merely of cutting down the quantity of bread, meat, and potatoes from a total of 304 ounces to one of 168 ounces per week; but the meat and potatoes were struck off altogether, except such small quantity of the juice and fibre of meat as was to be found in a broth containing one ox-head, and even less, to 100 rations. On a liberal estimate, the quantity of meat in the weekly rations of soup did not exceed 10 ounces for each prisoner. In order to ascertain whether the mere reduction in the quantity of the food could have been productive of such disastrous effects, I must again refer to the diet scales given in the earlier part of this paper. I find that the least liberal of the six pauper dietaries of 1836 allowed only 145 ounces of solid food, and 18 pints of liquid food, that the average of those dietaries only exceeded the reduced Millbank allowance in the solid elements by 5 ounces per week, while the liquid elements amounted only to 10 ounces in lieu of 21; that the minimum of the twelve pauper dietaries sanctioned by the Poor Law Board (doubtless after experience of their sufficiency) gives only two additional ounces of solid food per week, the liquid food amounting to only 11 ounces as against 21 of the Millbank dietary; that all the dietaries prescribed for the Scotch paupers in 1847, by Drs. Alison and Christison, fall greatly short of the Millbank reduced standard in their solid constituents; that the diet for soldiers under solitary confinement for less than 56 days also falls short of it both in the solid and in the liquid constituents; that the seventh of the Glasgow dietaries has 21 ounces less of solid food, and $10\frac{1}{2}$ pints of butter-milk for 21 pints of gruel and broth; and lastly, that the consumption of agricultural and other labourers, according to Mr. C. Mott's inquiries, falls short of the Millbank reduced dietary by no less than 28 ounces. This last comparison, if the consumption of the labourer is correctly estimated, is the most important of all, inasmuch as of the 140 ounces said to be consumed by him 136 consist of bread, of which the quantity given at Millbank amounted to 168 ounces.

After making due allowance for the long terms of confinement to which the prisoners at Millbank were subject in 1822, I am still of opinion that the mere reduction in the quantity of the food would

not account for the outbreak of scurvy, even in a site so notoriously unhealthy as Millbank then was. Nor, with the experience of Devizes, Stafford, and Glasgow before us, would it be safe to attribute the outbreak to the omission of meat from the dietary. There still remains a possible explanation of the event to which the researches of the late Dr. Baly lend an air of probability. In the "London Medical Gazette," February 10th, 1843, Dr. Baly published a short paper "On the Prevention of Scurvy in Prisons, Pauper Lunatic Asylums, &c.," in which, after citing Sir Gilbert Blane and M. Julia Fontenelle, in favour of the anti-scorbutic virtue of the potato, whether raw or cooked, he proceeds to make the following important statement:—"In the spring of 1840, I found that scurvy was a disease of rather frequent occurrence amongst one class of prisoners in the Millbank Penitentiary, the military offenders sentenced by court martial; whilst amongst the other more numerous class of inmates, the convicts, it was never seen." This led Dr. Baly to a comparison of dietaries, of which I append the particulars in a tabular form, the arrangement only being altered from his own tables. I omit the column showing the dietary for women, as this paper must be understood to deal throughout with the dietaries of adult males only:—

	Military Offenders.			Convicts.
	First Three Months.	Second Three Months.	Over Six Months.	
	ozs.	ozs.	ozs.	ozs.
Bread	168	168	168	176
Meat	12	18	24	20
Potatoes	Nil	Nil	8	80
Cheese.....	Nil	Nil	Nil	4
Onion	Nil	Nil	Nil	One
Total solid food	180	186	192	284
	pints.	pints.	pints.	pints.
Rice-soup without vegetables.....	2	2	2	—
Pea-soup with vegetables	—	1	1	1½
Gruel	17	15	14	11
Broth	—	—	—	3
Total liquid food	19	18	17	15½

The following is an abbreviation of Dr. Baly's valuable commentary on these facts:—

Nearly all the cases of scurvy, he says, occurred in soldiers who were passing through the second three months of their confinement in the penitentiary, during which period not only had they very nearly as ample a supply of animal food as the convicts, male and

female, but they had as much soup seasoned with vegetables, as the female convicts, who, although undergoing far longer terms of imprisonment, yet were free from scurvy. This exemption of the convicts from the disease, could, therefore, only be attributed to their weekly diet containing 5 lbs. of potatoes and an onion. In order to afford to the soldier a larger supply of vegetable food, Dr. Baly suggested the substitution for the rice-soup, which contained no fresh vegetables, of pea-soup with vegetables. The quantity of soup containing succulent vegetables was thus made to exceed the quantity given to the convict, and yet scurvy continued to appear among the soldiers. It prevailed to nearly, if not quite, the same extent after the change of diet as before; and it was evident that the quantity of vegetables usually contained in two or three pints of pea-soup given weekly was inadequate to prevent the occurrence of scurvy. Dr. Baly accordingly recommended that the soldiers, as well as the convicts, should have 1 lb. of potatoes with each dinner of meat. The soldiers thus came to have 2 lbs., or 32 ounces of potatoes every week during the first three months of their imprisonment, 3 lbs. during the second three months, and 4 lbs. after the expiration of six months. This addition to the dietary of the military prisoners was made in January, 1842, and not a single case of scurvy occurred up to February 10th, 1843, the date of Dr. Baly's paper. Dr. Baly then proceeds to give a short sketch of the outbreak of scurvy and dysentery at Millbank in 1823; and, after stating that he deems it "unnecessary to argue that the want of animal food could not have produced the scurvy," and showing that the reduced dietary "was not deficient in vegetable constituents, except as regarded the potatoes," gives it as his opinion, "that the withdrawal of the supply of potatoes was, in all probability, the cause of that part of the epidemic which was constituted by the scurvy;" and this inference he strengthens by the remarkable statement, that, since the date of the outbreak of scurvy and dysentery, the diet of the convicts "has contained an abundant supply of potatoes, and scurvy has never again attacked them; although other forms of disease, which were described as parts of the epidemic of 1823, namely, the fever, dysentery, and nervous affections, have frequently re-appeared."

Dr. Baly then fortifies his opinion thus expressed by citing the case of the Oxford County Gaol, in which a diet, consisting of bread 168 ounces, meat 4 to 12 ounces, and 14 pints of gruel per week, but with no regular allowance of vegetables, "potatoes or green vegetables being given only occasionally on Sundays, when the prison garden would furnish them," issued in the production of scurvy; and the case of the Northampton County Gaol, in which scurvy, having arisen under a dietary of bread, soup, and gruel, disappeared after the addition to it of 4 lbs. of potatoes weekly. Other

analogous facts are cited, and especially the striking case of the Stafford County Gaol, which I have already noticed, where, under a liberal allowance of bread, potatoes, and gruel, but no meat, no soup, and no milk, scurvy did not show itself.

It is worthy of remark, that the diet of military offenders for the first three months approximates very closely to the reduced dietary at Millbank. The quantity of bread is exactly the same, the 12 ounces of meat is little more than the equivalent, in the solid form, of the 10 ounces of meat in the soup at Millbank, while the two pints of rice-soup, without vegetables, and the 17 pints of gruel would probably contain less than the 14 pints of gruel and the 7 pints of soup after the supposed removal from it of the 10 ounces of meat.

The scurvy, which was a new disease at Millbank in 1822, occurred therefore under the long-continued use of a diet differing little from the military diet of the first three months, and not falling greatly short of that of the second three months. The condition of the prisoners in Millbank, in 1822, resembled that of the soldiers in 1840, in the total omission of the potato, the site of the prison, the season of the year, and the scurvy.

It is probable, therefore, that the epidemic scurvy which associated itself with the epidemic dysentery of Millbank as a mixed epidemic, in 1823, was not due to the mere reduction in the quantity of food, nor to the omission of solid meat from the dietary, but to the total exclusion of the potato element.

In this outbreak of disease, therefore, we have no clue to the solution of the question of sufficient or insufficient dietaries. It is obviously quite possible that the reduction of the quantity of bread from 168 ounces a week, or a pound and a half per diem, to 112 ounces a week, or a pound per diem, and the substitution for the half-pound of bread of the same quantity of potatoes, would have saved the prisoners from the scurvy, and the Government from the anxiety, trouble, and cost which the sad and perplexing epidemic of 1823 entailed upon it.

III.—*Existing Prison Dietaries.*

I must preface what I have to say on the subject of existing prison dietaries by reminding the Society that there are two distinct classes of prisoners to be provided for—the prisoners in our county gaols who are sentenced for periods varying from a few days to less than three years, and the convicts in our Government establishments whose sentences exceed three years. For the first class, it was necessary not only to prescribe dietaries for sentences of different length, but also to distinguish between sentences with and sentences without hard labour. In respect of the second class, a distinction was required to be made between that first and shorter part of the

sentence which is spent at Millbank, Pentonville, Leicester, or Wakefield, in separation, or in separation followed by association, and that larger part which is spent at public works (at Portland, Chatham, and Portsmouth, or at Dartmoor) in associated labour. I shall present these several dietaries in separate tables, and make such observations upon them as may throw light upon the curious varieties and anomalies which they present.

The existing dietaries for the county prisons date from the year 1843, when Sir James Graham, then Her Majesty's Secretary of State for the Home Department, addressed a letter to the Chairmen of Quarter Sessions, in which he adopts the recommendations of the Inspectors of Prisons. These recommendations, it should be stated were not unanimous, for one of their number, Mr. F. Hill, emphatically dissents from the received doctrine that the depressing effect of imprisonment on health could be counteracted by a liberal allowance of food; and he expressed his opinion on the contrary, "that a depressed state of the mind weakens the digestive powers, and makes them incapable of receiving even so much food as when the mind is cheerful." It was under the influence of an opposite feeling, and after consultation not only with the Prison Inspectors, but with medical men of the greatest eminence, possessing the advantage of long experience, that these dietaries were framed.*

The dietaries recommended for the use of county prisons, as given in the Return for 1857, are shown in the following table:—

County Gaols and Prisons.

Per Week.	Without Hard Labour.				With Hard Labour.			
	Class 1. Less than 7 Days.	Class 2. More than 7 Days, and not more than 21 Days.	Class 3. More than 21 Days, and not more than 4 Months.	Class 4. More than 4 Months.	Class 2. More than 7 Days, and not more than 21 Days.	Class 3. More than 21 Days, and not more than 6 Weeks.	Class 4. More than 6 Weeks, and not more than 4 Months.	Class 5. More than 4 Months.
Bread	ozs. 112	ozs. 168	ozs. 140	ozs. 168	ozs. 168	ozs. 140	ozs. 168	ozs. 154
Potatoes	—	—	64	32	—	64	32	112
Meat	—	—	6	12	—	6	12	16
Total solid food	112	168	210	212	168	210	212	282
Soup	Pints. —	Pints. —	Pints. 2	Pints. 3	Pints. 1	Pints. 2	Pints. 3	Pints. 3
Gruel	14	14	14	14	14	14	14	11
Cocoa	—	—	—	—	—	—	—	3
Total liquid food	14	14	16	17	15	16	17	17

* For the report of the inspectors, with the letter of Sir James Graham, see "Pereira on Diet," p. 491, and for voluminous details of the dietaries of prisoners and convicts, see Parliamentary Report, No. 154, 1857.

It is not easy to discover the principles on which this table was constructed; for though the quantities of meat and soup, and the aggregates of solid and of liquid food, increase with the length of the sentences, the bread and potatoes display very curious fluctuations. And though the transition from a sentence of less than four months, to one of more than four months, is marked in the case of prisoners not sentenced to hard labour by an increase of 2 ounces of solid, and 1 pint of liquid food per week, the transition from the shorter to the longer period, in the case of prisoners sentenced to hard labour, is marked by an increase of 70 ounces of solid food, and a substitution of 3 pints of cocoa for 3 of gruel; so that the alleged depressing effect of prolonged imprisonment without hard work, may be said to be represented by 2 ounces of solid and 1 pint of liquid food per week, while the wear and tear of hard labour is supplied by 70 ounces of solid food. It is also worthy of remark that while prisoners not sentenced to hard labour have only half the quantity of potatoes after four months, those sentenced to hard labour have, after the same period, upwards of three times the quantity of this wholesome vegetable. I have some further observations to make on the figures in the last column of this table, but I reserve them till I shall have presented the remainder of the dietary tables.*

The table which follows, exhibits the ordinary diets of the convict prisons for Pentonville, Wakefield, and Millbank, in which the separate system of imprisonment prevails during the whole of the prisoners' sojourn in them, or during some months at the commencement, the remainder being passed in association; for Portland, Chatham, and Portsmouth, at which the men are employed in outdoor labour at such work as is required in our dockyards and arsenals; and for Dartmoor, at which a portion only of the prisoners are engaged in farming and gardening operations, admitting of comparison, in point of exertion, with the labour required at Portland, Portsmouth, and Chatham, most of the prisoners when first sent to Dartmoor being disabled or deformed in body, weak in health, or of feeble intellect.

* It may be well, in this place, to show to what extent the county gaols and prisons have followed the suggestions of the Home Office, made to them in 1843. Between forty and fifty of the whole number have conformed to the prescribed dietaries, but a still larger number have adopted dietaries of their own, and these display every possible difference in the proportion of the elements of which they consist. In the element of bread for instance, the quantity varies between a minimum of 30 and a maximum of 224 ounces; in that of meat, between nil and 25 ounces; in that of potatoes, between 24 and 112; and in the total of solid food, between 100 and 340 ounces. But where the quantity of these articles of food is smallest, the dietary is enriched by such additions as milk porridge, Indian meal pudding made with milk, and suet pudding.

Convict Establishments—(Ordinary Diet).

Per Week.	Pentonville.	Wakefield.	Millbank.	Portland.	Portsmouth and Chatham.	Dartmoor.
	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.
Bread	140	140	154	150	189	165
Potatoes	112	112	112	112	112	112
Meat	28	28	35	39	39	39
Suet pudding	—	—	—	30	—	32
Total solid food	280	280	301	331	340	348
	Pints	Pints.	Pints.	Pints.	Pints.	Pints.
Soup	3½	3½	3½	3	3	3
Gruel	7	7	7	7	7	4
Cocoa	5¼	—	5¼	3	7	10
Milk	—	5¼	—	—	—	—
Tea	—	—	—	4	—	—
Molasses	—	—	—	3	—	—
Total liquid food	15¾	15¾	15¾	20	17	17

This table, too, is full of anomalies and inconsistencies, some of which must remain even after the explanations now to be given.

The Pentonville dietary, as already explained, was adopted as the direct result of experiments not free from objection. The dietary at Wakefield is the same dietary with a single exception. The history of the Millbank dietary is less perfectly known. All that I have been able to ascertain with certainty is, that in the year 1840, the dietary consisted of bread, meat, potatoes, and cheese, with one onion, pea-soup, broth, and gruel, in the quantities stated in the last column of the table at p. 270; but that at some period previous to 1854, the cheese was omitted, the meat and potatoes increased, and the bread diminished, that prior to the outbreak of cholera in 1854, meat was given five times a-week and soup twice, but that during the prevalence of the cholera Dr. Baly recommended the substitution of meat for soup on the remaining two days in the week, and that, on its subsidence, he still caused the same altered diet to be retained; and further, that he objected to the reduction of the 154 ounces of bread to the 140 ounces of Pentonville, alleging as his reason the unhealthy site of Millbank. But in comparing these two dietaries with each other it ought to be understood that the soup of Pentonville is the meat-liquor strengthened by additions of meat and vegetables, while the soup of Millbank is little better than the liquor in which the meat is boiled.

Of the three dietaries of Portland, Portsmouth and Chatham, and Dartmoor, it is impossible to give any rational account. The

strongest and most robust prisoners are sent to Portland; those who are less vigorous and robust to Portsmouth and Chatham; and those who are fit only for light labour to Dartmoor, to which place also are sent the maimed, crippled, and deformed, the scrofulous and the consumptive, and men of weak minds. And yet the dietaries of these three prisons, all largely in excess of Pentonville and even of Millbank, seem to be framed in a spirit of contradiction. The robust prisoner at Portland gets less food than the less vigorous inmate of Portsmouth or Chatham, and this last gets less than the most effective of the invalids of Dartmoor. But ample as the ordinary diet at these convict establishments is, it has not been deemed sufficient for the whole period of confinement; for the tables of 1857, add an "increased" diet in the case of Portland, and in all the prisons additions to the dietaries for men in the third and fourth stages. The particulars of these several dietaries are shown as accurately as possible, consistent with brevity, in the subjoined table:—

Convict Establishments—(Ordinary and Increased Diets, with Additions).

Per Week.	Portland.				Portsmouth and Chatham.			Dartmoor.		
	Ordinary.	Increased.	Third Stage.	Fourth Stage.	First and Second Stages.	Third Stage.	Fourth Stage.	Ordinary (Hard Labour).	Invalid (Light Labour).	Third and Fourth Stage.
	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.	ozs.
Bread	150	201	204	204	189	192	192	165	168	169
Potatoes	112	112	112	112	112	112	112	112	112	112
Meat	39	39	39	39	39	39	39	39	24½	39
Suet pudding	30	30	30	35	—	—	8	32	—	32
Cheese	—	—	2	2	—	2	2	—	—	2
Total solid food	331	382	387	392	340	345	353	348	304½	354
	Pints.	Pints.	Pints.	Pints.	Pints.	Pints.	Pints.	Pints.	Pints.	Pints.
Soup	3	7	7	7	7	7	7	3	7	3
Gruel (or tea*)	7	7*	7*	7*	7	7*	7*	4	7	—
Tea	—	4	4	4	—	—	—	—	—	4
Cocoa	7	3	3	3	7	7	7	10	7	10
Beer or porter	—	—	½	½	—	½	½	—	—	½
Total liquid food	17	21	21½	21½	21	21½	21½	17	21	17½

In order to give a complete view of these dietaries it would be necessary to enter into details inconsistent with the narrow limits of this paper. I must, therefore, content myself with remarking that as much anxiety seems to have been shown to provide the convicts with variety as with abundance of food. The undue monotony of the Millbank dietary, with its five ounces of boiled beef every day,

is exchanged for the opposite extreme of variety, and beef alternates with mutton, and baked meat with boiled, while tea takes the place of gruel, and one pudding of another. Even the "invalid diet" of Dartmoor, for convicts employed at "light labour," is more liberal than the ordinary diets of Millbank and Pentonville. Dietaries so ample, so varied, and so different, are only to be accounted for on the supposition that additions made to meet occasional and transitory emergencies, or to silence the importunities of prisoners, have been retained through forgetfulness, or from aversion to change. That such causes are in operation, the facts already stated with reference to Millbank Prison will show.

There is also reason to believe that the example of Millbank has been brought to bear on the county prisons; for the dietary recommended by the Home Office in 1843, for prisoners sentenced to hard labour for periods exceeding four months (Class 5), is in many respects identical with the ordinary diet at Millbank. The quantities of bread and potatoes, and the distribution of the bread over the three meals, are the same in both dietaries, and in both meat is given on certain days in the week and soup on others.*

It will be seen that, throughout this communication, I have attached great importance to the dietary history of Millbank Prison. I have done so, not merely because the physician who holds the appointment of medical superintendent is usually consulted by the Government, on matters relating to the health of its officers and of the convicts generally, and particularly respecting dietaries, but because the epidemic of 1823, and the formerly unhealthy state of the prison, co-operating with the opinion entertained by John Howard, that the depression caused by imprisonment necessitates a liberal diet, have exercised a marked influence on the selection of all our prison dietaries. Millbank Prison has thus become the centre of a cautious and timid policy in matters of diet, and the cause of an unnecessary expenditure, of which the amount may be guessed at by the aid of an assertion which I believe I am justified in making, that

* It will be seen that in 1840, when scurvy prevailed among the military prisoners at Millbank, the ordinary diet of the convicts consisted of 176 ounces of bread, 20 ounces of meat, and 80 ounces of potatoes, with 4 ounces of cheese and an onion. Now it appears highly probable that, impressed as he was with the value of the potato as an anti-scorbutic, Dr. Baly, soon after this date, recommended an increase of the potatoes to 112 ounces, and of the meat to 25 ounces, reducing the bread from 176 to 154 ounces, and suppressing the 4 ounces of cheese and the onion, so as to establish the dietary in use at the advent of the cholera in 1854. If this conjecture be well founded—if the allowance of bread and potatoes recommended for the county prisons was really copied from the Millbank dietary, the quantity of meat being somewhat reduced—then it follows that an allowance of bread exceeding that in use at Pentonville by 14 ounces a-week, and justified only by the alleged unhealthiness of Millbank, has been extended to such of the county prisons as have adopted the recommendations of the Home Office.

the extra supply of bread retained in consequence of the alleged unhealthiness of the site, and the changes made in 1854, during the prevalence of the cholera, and solely on account of the cholera, have not cost the Government, on an average of cheap and dear years, less than 1,000*l.* per annum.

As Millbank Prison is now, and has been for the four years that I have held office in it, free from every malady which can be traced to a local cause, one of the reasons for an excessive dietary no longer exists; another reason passed away with the epidemic cholera of 1854; and the only one that now remains is the theory which attributes to imprisonment itself, and especially to solitary confinement, a depressing influence, for which a liberal diet is in some sense a remedy.

Now this theory is based upon the two distinct assumptions that imprisonment exercises a depressing effect upon the mind, and through it, upon the body, and that this depressed and enervated condition necessitates a liberal diet.

The first of these assumptions is justified by observation, but the mental depression and consequent loss of strength are, according to my own observation, much less considerable than is usually supposed. They are certainly not such as must have existed in the days of John Howard. Perhaps one prisoner in a thousand will exhibit great grief and continued depression, and one or two others a marked loss of spirits; but the great majority, including even men of education, who have lived previous to their imprisonment in luxury and refinement, adapt themselves to their new circumstances in a very remarkable manner. The favourable rate of mortality among the convicts, the absence of diseases usually ascribed to mental anxiety and depression, and the small number of cases of unsoundness of mind which can be traced with any show of probability to the influence of imprisonment, concur, with the appearance of the prisoners themselves, to cast a doubt on the soundness of the popular belief, which ascribes to imprisonment a highly depressing effect. But, though not depressing to the degree which is usually supposed, imprisonment must affect the mind with a certain listlessness which in and out of prison is inseparable from the want of those stirring occupations to which the necessities of some and the ambition of others give rise. But as for the *ennui* which afflicts the rich man, destitute of a fitting occupation, no sensible physician would prescribe a highly nutritious diet, so in the case of the prisoner, afflicted with the same want of spontaneous occupation, it may admit of doubt whether a like prescription would be reasonable or right. At any rate, it may be safely affirmed that the theory under consideration is little better than a prevalent opinion, not undeserving of respect, but quite open to discussion. And even if we assume that mental

depression and bodily lassitude demand a nutritious diet, we ought not to forget that all the other circumstances which surround the prisoner are exactly such as every well-informed physician, and every man of sense must admit as reasons for reducing the supply of food. The prisoner spends more time in bed than the working man does; he is warmly clad, lives and sleeps in a warm atmosphere, and is protected from the weather; he is not worked beyond his strength, he has time for his meals, he has no pressing anxieties, or urgent claims. His wear and tear of body and mind are reduced to the lowest point. These, then, are reasons for a moderate dietary scale, which must, in any case, be set off against the one solitary argument in favour of a liberal dietary. It is a very curious circumstance that Dr. Copland Hutchison, the Medical Superintendent of Millbank Prison in 1822, believed that the then ordinary diet of the prisoners, which is somewhat less nutritious than that now in use, was excessive, and injurious to the convicts, and that he founded his opinion on the prevalence among them of plethora and the diseases arising out of fulness of habit; and yet neither my predecessor, Dr. Baly, nor I myself, have had any experience of those diseases, nor any such reason to condemn the diet of the present day as excessive. Now, as the convicts of 1822 were confined in a prison at that time certainly unhealthy, for much longer terms than the convicts of the present day in a very healthy prison, there is a fair presumption that the depressing effects of imprisonment, even when reinforced by an unhealthy site, are rather exaggerated than otherwise by a liberal dietary. The liberal dietary of 1822 was thought to have produced disease in convicts confined for long periods in an unhealthy prison; the equally liberal diet of 1863 seems to preserve in health the convicts shut up for shorter periods in a healthy one. Might not a reduced diet have improved the health of the inmates of Millbank in 1822? and might not the like reduction be consistent with the maintenance of health and vigour in the same class in 1863?

I shall now bring this communication to a close by stating, as distinct propositions, the results to which the foregoing inquiry has led me:—

1. That though the elementary constituents of a wholesome and nutritious diet, and the articles of food which yield them, are ascertained with sufficient accuracy, the quantity of food required to support any given body of men in health and efficiency, is not, and cannot be, precisely determined.

2. That the difficulties which attach to the selection of dietaries adapted to the peculiar conditions and circumstances of different bodies of men, make themselves felt to an extreme degree in the case of prisoners.

3. That the very circumstance of large bodies of men differing

widely from each other in age, constitution, and occupation, being supported in apparent health and vigour on the same dietary, proves conclusively that food may be taken in excess of the real wants of the frame without producing effects which shall attract the notice even of the most careful and watchful observer.

4. That we possess no conclusive tests of sufficient or insufficient dietaries; and that the test of weight, which is the most precise, cannot be safely applied till we shall have obtained more accurate information than we now possess respecting the causes, other than food, which affect the weight of the body.

5. That the value of the experiments made at Pentonville Prison in 1842 is impaired partly by the want of this information, and partly by the want of scientific exactness.

6. That we possess conclusive evidence of the sufficiency of a diet from which meat is wholly excluded, and even of a diet consisting entirely of vegetable matter; that such a diet would probably suffice for able-bodied paupers, and even for prisoners sentenced to hard labour, and for convicts employed at public works; and that this is true of men previously accustomed to animal food.

7. That the potato is an important element in our dietaries, and that its omission has probably been the true cause of outbreaks of scurvy which have been attributed to a mere reduction in the quantity of food.

8. That the existing prison dietaries present many curious anomalies very difficult of explanation, except on the supposition that additions made for temporary reasons, such as a wish to satisfy the importunities of prisoners, or a transitory departure from health or outbreak of disease in a small section of the prisoners, have become permanent through inadvertence, or from an aversion to change.

9. That the dietaries of our county prisons, for periods exceeding four months, and all the dietaries of our convict establishments, are greatly in excess of the dietaries of able-bodied paupers, and probably in excess of the requirements of the prisoners themselves.

10. That our prison dietaries have been framed under the influence of an exaggerated estimate of the depressing effect of imprisonment, and of an opinion, probably ill-founded, that the physical effects of such depression can be counteracted by increased supplies of food.

11. That our prison dietaries have also been framed under the influence of a timid feeling, originating in misconceptions as to the true cause of the epidemic of Millbank Prison, but especially in the belief that it was due to a reduction in the quantity of food.

12. That some reduction in the dietaries of our convict establishments might be made with safety and economy; and that further reductions would probably be justified by well-devised experiments.

